MHT CET 2026 PCB Apr 22 Shift 2 Question Paper

Conducted by the State Common Entrance Test Cell, Maharashtra

Time Allowed: 180 Minutes **Total Questions: 200** **Maximum Marks: 200**

General Instructions

(i) This **PCB** paper is from **MHT CET 2026**, conducted by the **State Common Entrance Test Cell, Maharashtra**.

(ii) Answer all **200 multiple choice questions**: **50 Physics**, **50 Chemistry** and **100 Biology**.

(iii) Each question offers **four choices**, with **one correct answer**.

(iv) Allow **90 minutes for Physics and Chemistry together**, followed by **90 minutes for Biology**. The first group closes before the second opens.

(v) Every correct answer earns **1 mark**.

(vi) There is **no negative marking**. Unanswered questions score zero.

1. The area of a triangle formed by vectors $\vec{P} = (3\hat{i} - 4\hat{j} + 2\hat{k})$ m and $\vec{Q} = (\hat{i} + \hat{j} - 2\hat{k})$ m as adjacent sides is approximately

(A) 12 m^2 (B) 6 m^2

(C) 14 m^2 (D) 7 m^2

2. The metre scale is used to measure the volume of a block. The measured length is 10 cm, breadth is 20 cm and height is 25 cm. The percentage error in the measurement of volume of a block is... (least count of metre scale = 1mm)

(A) 0.19 % (B) 1.9 %

(C) 19 % (D) 0.019 %

3. Two small bodies of different masses are projected upwards with the same velocity but making angle of projection of 30° and 60° with the horizontal. Both these bodies will

(A) attain the same height. (B) have the same time of flight.

(C) have same trajectory. (D) have the same horizontal range

4. A ball is thrown vertically downwards from a height of 30 m with initial velocity V_0. It collides with the ground and loses 60 % of its energy in collision and rebounds to 20 m. The initial velocity V_0 is ($g = 10$ m/s^2).

(A) 20 m/s (B) 10 m/s

(C) 30 m/s (D) 40 m/s

5. A uniform disc of mass 'm' and radius 'R' is rolling up a rough inclined plane which makes an angle of 30° with the horizontal. If the coefficient of friction is μ and only forces acting are gravitational and frictional, then the magnitude of the frictional force 'f' is $\left(\sin 30^\circ = \frac{1}{2}\right)$

(A) $\frac{mg}{6}$ (B) $6mg$

(C) $\frac{mg}{3}$ (D) $3mg$

6. A child is standing with folded hands at the centre of the platform rotating about its central axis. The rotational kinetic energy of the system is 'K'. The child now stretches his arms so that the moment of inertia of the system doubles. The rotational kinetic energy of the system now is 'K_1'. The ratio K_1/K is

(A) 4 (B) $\frac{1}{4}$

(C) $\frac{1}{2}$ (D) 2

7. A thin rod of mass 'm' and length '$2l$' is made to rotate about an axis passing through its center and perpendicular to its length. If the angular velocity changes from 0 to ω in time 't', then the torque acting on it is

(A) $\frac{ml^2\omega}{12t}$ (B) $\frac{ml^2\omega}{3t}$

(C) $\frac{ml^2\omega}{t}$ (D) $\frac{4ml^2\omega}{3t}$

8. According to Kepler's second law of planetary motion, the magnitude of areal velocity $\left(\frac{\Delta A}{\Delta t}\right)$ of a planet of mass 'm' revolving around the sun is constant and is equal to ('p' is the linear momentum and 'L' is the angular momentum)

(A) $\frac{p^2}{2m}$ (B) $2mL$

(C) $\frac{p}{m}$ (D) $\frac{L}{2m}$

9. The speed of wind over the wings of a small aeroplane is 70 m/s and below the wings is 60 m/s. If the mass of the aeroplane is 1000 kg and the area of wing is 14 m^2, then the net vertical force on the aeroplane will be (density of air = 1.2 kg/m^3 and $g = 10$ m/s^2)

(A) 920 N downward (B) 920 N upwards

(C) 620 N downward (D) 620 N upward

10. If the soluble impurity is added to a solvent, then the angle of contact

(A) decreases (B) increases

(C) depends on the nature of soluble impurity (D) angle of contact is independent of the presence of impurity

11. The pressure at the bottom of a water tank is NOT proportional to

(A) density of water.
(B) height of water in the tank.
(C) area of the water surface.
(D) acceleration due to gravity.

12. Coefficient of linear expansion of brass and steel rods are α_1 and α_2. Lengths of brass and steel rod are l_1 and l_2 respectively. Though the temperature of brass and steel is increased, $(l_2 - l_1)$ is maintained same at all temperatures, which of the following relations holds good?

(A) $\alpha_1^2 l_2 = \alpha_2^2 l_1$
(B) $\alpha_1 l_1 = \alpha_2 l_2$
(C) $\alpha_1 l_2 = \alpha_2 l_1$
(D) $\alpha_1^2 l_1^2 = \alpha_2^2 l_2^2$

13. Two spherical stars, A and B emit black body radiation. The radius of star A is 400 times that of star B and star A emits power 10^4 times emitted from star B. λ_A and λ_B are the wavelengths at which the peak occurs in their respective radiation curves such that $\lambda_A = x\lambda_B$. The value of x is

(A) $\frac{1}{4}$
(B) 4
(C) 2
(D) $\frac{1}{2}$

14. For the Carnot heat engine, if the temperature of the hot reservoir is increased, then efficiency of the Carnot engine

(A) decreases.
(B) increases.
(C) remains constant.
(D) first increases and then becomes constant.

15. For an isochoric process, which of the following statements is NOT true?

(A) $\Delta T = 0$
(B) $\Delta V = 0$
(C) $W = 0$
(D) $Q = \Delta U$

16. The total internal energy of one mole of HCl molecule is (assume the molecule to be non-rigid)

(A) $\frac{3}{2}RT$
(B) $\frac{7}{2}RT$
(C) $\frac{5}{2}RT$
(D) $\frac{9}{2}RT$

17. If the pressure of the gas is kept constant, then the mean free path (λ) of a gas varies with temperature (T) according to relation

(A) $\lambda \propto T$
(B) $\lambda \propto \sqrt{T}$
(C) $\lambda \propto \frac{1}{\sqrt{T}}$
(D) $\lambda \propto \frac{1}{T}$

18. There is a large difference between the frequencies of the external periodic force and the natural frequency of a body. The body will

(A) not vibrate.
(B) vibrate with large amplitude at the frequency of external periodic force.
(C) vibrate with small amplitude at the frequency of external periodic force.
(D) vibrate with small amplitude at the own natural frequency.

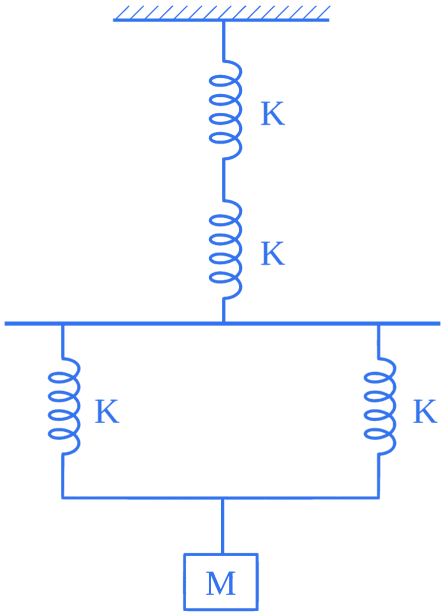
19. When a particle in linear S.H.M. completes two oscillations, its phase changes by

(A) 2π radian
(B) 4π radian
(C) π radian
(D) 3π radian

20. A particle executes S.H.M. between $x = -A$ and $x = +A$. The time taken for it to go from mean position O to $\frac{A}{2}$ is T_1 and to go from $\frac{A}{2}$ to A is T_2, then $(\sin 30^\circ = 1/2, \sin 90^\circ = 1)$

(A) $T_1 = 2T_2$
(B) $T_1 = T_2$
(C) $T_1 > T_2$
(D) $T_1 < T_2$

21. The body of mass M is performing S.H.M. as shown in the figure. The periodic time 'T' of oscillation of a given system is



(A) $2\pi\sqrt{\frac{5M}{2k}}$
(B) $2\pi\sqrt{\frac{2M}{5k}}$
(C) $\frac{1}{2\pi}\sqrt{\frac{5M}{2k}}$
(D) $\frac{1}{2\pi}\sqrt{\frac{2M}{5k}}$

22. In the context of the Doppler effect in sound, which statement is true regarding the wave speed in the medium?

(A) The speed of sound increases if the source moves towards the observer.
(B) The speed of sound decreases if the source moves away from the observer
(C) The speed of sound remains the same regardless of the relative motion between the source and observer.
(D) The speed of sound changes based on the observer's velocity.

23. In a resonance tube experiment, three successive resonances are produced by adjusting the air column of the tube in the ratio $1:5:x$. If the frequency of tuning fork is 380 Hz and velocity of sound at 27° C is 340 m/s, then the value x is

(A) 10
(B) 13
(C) 9
(D) 15

24. If two waves $y_1 = A\sin(\omega t - 0.1x)$ and $y_2 = A\sin\left(\omega t - 0.1x - \frac{\phi}{2}\right)$ are superimposed on each other, then the resultant amplitude due to superposition of waves is

(A) $A\sqrt{2\left(1+\cos\frac{\phi}{4}\right)}$
(B) $A\sqrt{2\cos\frac{\phi}{2}}$
(C) $2A\cos\frac{\phi}{4}$
(D) $2A\cos\frac{\phi}{2}$

25. A charge Q is divided into two parts and placed at a given distance so that the force between them is maximum. The value of each charge is:

(A) $\frac{Q}{2}, \frac{Q}{2}$
(B) $\frac{3Q}{4}, \frac{Q}{4}$
(C) $\frac{Q}{3}, \frac{2Q}{3}$
(D) $\frac{2Q}{3}, \frac{Q}{3}$

26. Equipotential surfaces associated with an electric field that is increasing in magnitude along the positive Y-direction are

(A) planes parallel to XY plane.
(B) planes parallel to YZ-plane.
(C) planes parallel to XZ-plane.
(D) planes parallel to Y-direction.

27. Assume that an electric field $\vec{E} = 30x^2\hat{i}$ N/C exists in space. If V_0 is the potential at the origin and V_A is the potential at $x = 2$ m, then the potential difference $V_A - V_0$ is

(A) $-80\ V$
(B) $80\ V$
(C) $-120\ V$
(D) $120\ V$

28. A parallel-plate air capacitor has a capacity 'C', a separation 'x', a dielectric material with a dielectric constant 'k' between plates, and a potential difference of 'V' volt applied between plates. The force of attraction between the plates is

(A) $\frac{kCV^2}{2x}$
(B) $\frac{kCV^2}{2}$
(C) $\frac{kCV}{2x}$
(D) $\frac{kCV^2}{x}$

29. A galvanometer of resistance 'G', is shunted by a resistance 'S' ohm. To keep the main current in the circuit unchanged, the resistance to be put in series with the galvanometer is

(A) $\frac{SG}{S+G}$
(B) $\frac{G}{S+G}$
(C) $\frac{G^2}{S+G}$
(D) $\frac{S^2}{S+G}$

30. In a Wheatstone's metre bridge, resistances R and S are connected in left and right gap, null point is obtained as l. After interchanging the resistances in the gaps, null point shifts to the left by 20 cm. If the series resistance of R and S is 2 kΩ, then the value of resistance R is

(A) 1200 Ω
(B) 800 Ω
(C) 2000 Ω
(D) 1000 Ω

31. A long straight wire along the z-axis carries a current 'I' in the negative z-direction. The magnetic induction '$\vec{B}$' at a point having co-ordinates (x, y) on the $z = 0$ plane is

(A) $\frac{\mu_0 I(y\hat{i}-x\hat{j})}{2\pi(x^2+y^2)}$
(B) $\frac{\mu_0 I(x\hat{i}+y\hat{j})}{2\pi(x^2+y^2)}$
(C) $\frac{\mu_0 I(x\hat{j}-y\hat{i})}{2\pi(x^2+y^2)}$
(D) $\frac{\mu_0 I(x\hat{i}-y\hat{j})}{2\pi(x^2+y^2)}$

32. A closely wound solenoid of 1000 turns and area of cross-section 2×10^{-4} m^2 carries a current of 2 A. It is suspended through its centre and perpendicular to its length, allowing it to turn in a horizontal plane in a uniform magnetic field 5×10^{-2} T making an angle of 60° with the axis of solenoid. The torque on a solenoid will be nearly $\left(\sin 60^\circ = \frac{\sqrt{3}}{2}\right)$

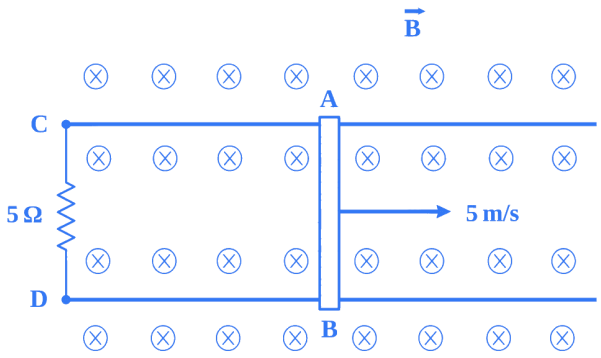
(A) 1.7×10^{-2} Nm
(B) 1.5×10^{-2} Nm
(C) 3.4×10^{-2} Nm
(D) 2×10^{-2} Nm

33. The magnetic induction produced at the centre of the air-core solenoid is B_0. If the air-core is replaced by an iron-core of susceptibility χ, the magnetic induction is B_1. The ratio of $\frac{B_1}{B_0}$ is

(A) χ (B) $1-\chi$

(C) $1+\chi$ (D) $\frac{1}{\chi}$

34. A conducting rod AB is in contact with metal rails AC and BD, which are 0.25 m apart in a uniform magnetic field of induction 0.4 T acting perpendicular to the plane of the figure. Ends C and D are connected through a 5 Ω resistor. If the rod AB moves to right with a velocity of 5 m/s, then the magnitude and direction of the current through rod AB is



(A) 0.1 A from A to B (B) 0.1 A from B to A

(C) 1 A from A to B (D) 1 A from B to A

35. The self-inductance L of a toroid having circular cross-section of radius r and major radius R is ($r \ll R$)

(A) $\frac{\mu_0 N^2 R^2}{r^2}$ (B) $\frac{\mu_0 N^2 R^2}{2r}$

(C) $\frac{\mu_0 N^2 r^2}{R^2}$ (D) $\frac{\mu_0 N^2 r^2}{2R}$

36. When a 60 mH inductor and resistor are connected in series with an AC source, the voltage leads the current by 60°. If the inductor is replaced by a 0.5 μF capacitor, the voltage lags behind the current by 30°. The frequency (in Hz) of AC supply is $\left(\tan 30^\circ = \frac{1}{\sqrt{3}}, \tan 60^\circ = \sqrt{3}\right)$

(A) $\frac{10^4}{\pi}$ (B) $\frac{10^4}{4\pi}$

(C) $\frac{10^4}{2\pi}$ (D) $\frac{3\times 10^4}{2\pi}$

37. A series LCR circuit is connected to an AC source of 220 V, 50 Hz. The circuit contains resistance of 100 Ω, capacitor of capacitive reactance X_C Ω and inductor of inductive reactance $X_L = 150$ Ω. If the power factor of the circuit is $\frac{8}{10}$ and, $X_L > X_C$, then the value of X_C is

(A) 50 Ω (B) 140 Ω

(C) 75 Ω (D) 100 Ω

38. At resonance, the LC parallel resonant circuit

(A) has zero impedance. (B) has a very high impedance.

(C) has a very high current. (D) has a very low resistance.

39. In a step-up transformer, if the voltage in the secondary is increased, then the current in the primary:

(A) Increases (B) decreases

(C) does not change (D) becomes zero

40. A convex lens of refractive index μ has two surfaces of equal radius of curvature R. The focal length of convex lens is

(A) $\frac{2(\mu-1)}{R}$ (B) $\frac{R}{2(\mu-1)}$

(C) $\frac{(\mu-1)}{2R}$ (D) $\frac{2R}{(\mu-1)}$

41. Light enters from air into water of refractive index $\frac{4}{3}$. The percentage change in its wavelength is

(A) 25 % (B) 50 %

(C) 30 % (D) 20 %

42. Unpolarized light of intensity I_0 is made to pass through three polarizers P_1, P_2 and P_3 successively. The polarization axis of P_2 makes an angle of 60° with that of P_1, while that of P_3 makes an angle of 45° with that of the P_2. If $I_0 = xI_3$, the value of 'x' is $\left(\cos 45^\circ = \frac{1}{\sqrt{2}}, \cos 60^\circ = \frac{1}{2}\right)$

(A) 8 (B) 16

(C) 32 (D) 64

43. Which of the following condition is TRUE for Fresnel diffraction?
(i) Source of light and the obstacle (slit) are at large distance (infinite) from each other.
(ii) Wavefront incident on the obstacle (slit) is plane.
(iii) The wavefront incident on the obstacle (slit) is either cylindrical or spherical depending on source.
(iv) A convex lens is not required to observe diffraction pattern on the screen.

(A) (i), (iii) and (iv) are true
(B) (iii) and (iv) are true
(C) (i) and (ii) are true
(D) (i) and (iii) are true

44. The de-Broglie wavelength of the free electron is 'λ' and has a kinetic energy E_k. If the kinetic energy of the free electron is made double, the new de-Broglie wavelength is 'λ_1'. If $\lambda_1 = x\lambda$, then the value of x is

(A) $\frac{1}{2}$
(B) $\frac{1}{\sqrt{2}}$
(C) 2
(D) $\sqrt{2}$

45. If the photoelectric work function of a metal is 'ϕ' and the frequency of incident light is 'ν', there is no emission of photoelectrons if

(A) $\nu < \frac{\phi}{h}$
(B) $\nu = \frac{\phi}{h}$
(C) $\nu > \frac{\phi}{h}$
(D) $\nu \geq \frac{\phi}{h}$

46. The ratio between the areas of Bohr's first three orbits of the hydrogen atom are

(A) 1 : 16 : 81
(B) 1 : 8 : 27
(C) 1 : 4 : 9
(D) 1 : 2 : 3

47. For a radioactive nucleus that undergoes β^+ decay, which of the following **CANNOT** occur?

(A) Nuclei with lower atomic number than that of original nucleus is produced.
(B) The proton is converted to neutron
(C) Isobar of original nucleus is produced.
(D) Isotope of original nucleus is produced.

48. The depletion region of a p-n junction is formed due to

(A) drift of majority carriers under the influence of an applied electric field.
(B) thermal energy exciting electrons from the p-side to the n-side.
(C) diffusion of majority carriers across the junction immediately after formation, leaving behind fixed immobile ions.
(D) the physical removal of material at the junction interface during manufacturing

49. Which of the following gives output 0 in the NAND gate?

(A) $A = 1, B = 0$
(B) $A = 1, B = 1$
(C) $A = 0, B = 0$
(D) $A = 0, B = 1$

50. Which of the following LED emits red and yellow light?

(A) $Ga - As - P$
(B) $Ga - P$
(C) $Ga - As$
(D) $As - P$

51. Calculate the number of carbon atoms present in 11 g of carbon dioxide.

(A) 7.5275×10^{23} (B) 1.5055×10^{23}

(C) 3.011×10^{23} (D) 6.022×10^{23}

52. Visible light has a wavelength of 700 nm. Calculate its frequency in hertz.

(A) 7.451×10^{14} Hz (B) 3.502×10^{14} Hz

(C) 4.286×10^{14} Hz (D) 4.882×10^{14} Hz

53. Identify the metalloid element from the following.

(A) O (B) S

(C) Te (D) Cl

54. Which of the following is the decreasing order of covalent character of alkali metal halides?

(A) MF > MCl > MBr > MI

(B) MF > MCl > MI > MBr

(C) MI > MBr > MCl > MF

(D) MCl > MI > MBr > MF

55. What is the number of bonding and antibonding electrons, respectively, in Li_2 molecule?

(A) 2 and 4 (B) 3 and 2

(C) 4 and 2 (D) 2 and 3

56. The density of a gas at 27° C and 1 atm pressure is 2.6 g/dm^3. What is molar mass of gas? [$R = 0.0821$ L atm K^{-1}mol^{-1}]

(A) 52.2 g/mol (B) 60 g/mol

(C) 64.04 g/mol (D) 72 g/mol

57. Determine the constant external pressure required to compress 2 mole of an ideal gas from volume 10.8 dm^3 to 5.4 dm^3 if the work obtained is 2460 J.

(A) 2.28 bar (B) 1.14 bar

(C) 3.42 bar (D) 4.56 bar

58. For a certain reaction, the enthalpy change and entropy change are +50 kJ and −50 J/K respectively at 27°C, What is the Gibbs free energy change of reaction?

(A) −65 kJ (B) 35 kJ

(C) −35 kJ (D) 65 kJ

59. When is the reaction spontaneous?

(A) $\Delta G = 2.0$ (B) $\Delta G < 0$

(C) $\Delta G = 0$ (D) $\Delta G = 1$

60. The solubility product of aluminium hydroxide at 298 K is 4.2×10^{-14}. Calculate its solubility in mol/L at same temperature.

(A) 2.815×10^{-4} (B) 2.426×10^{-4}

(C) 3.412×10^{-4} (D) 1.987×10^{-4}

61. What is the pH of buffer solution containing 10 times higher molar concentration of weak base than the molar concentration of salt of weak base with strong acid at 298 K? (K_b of weak base $= 10^{-5}$)

(A) 6 (B) 4

(C) 9 (D) 10

62. Identify the strong electrolyte.

(A) $CaCl_2$ (B) $Ca(OH)_2$

(C) NH_3 (D) HCN

63. The oxidation number of nitrogen in ammonia (NH_3) is:

(A) +3 (B) −3

(C) +5 (D) −5

64. What is IUPAC name of acrylic acid?

(A) 3-Methylbut-3-enoic acid (B) 3-Methylpent-2-enoic acid

(C) Prop-2-enoic acid (D) But-3-enoic acid

65. Which of the following factors is associated with optical activity of a molecule?

(A) plane polarized light (B) 3-D structure of a molecule

(C) Achiral molecule (D) Superimposable mirror images

66. The delocalization of electrons due to overlap between p-orbital and sigma bond is called.

(A) Inductive effect (B) electronic effect

(C) hyperconjugation (D) resonance

67. Identify the type of reaction when benzene reacts with nitrating mixture.

(A) Substitution (B) Addition

(C) Elimination (D) Polymerization

68. Sodium forms bcc structure. The molar mass of sodium is 23 g/mol. What is the mass of 3 unit cells of sodium?

(A) 2.2915×10^{-22} g (B) 7.638×10^{-23} g

(C) 3.819×10^{-23} g (D) 1.5277×10^{-22} g

69. What type of the following defect is produced when NaCl crystal is doped with $MgCl_2$?

(A) Interstitial defect (B) Schottky defect

(C) Frenkel defect (D) Impurity defect

70. Which of the following defects exhibit colour to solid alkali metal halides?

(A) Interstitials (B) F-centre

(C) Schottky defects (D) Frenkel defects

71. The maximum amount of a solid solute that can be dissolved in a specified amount of a given liquid solvent does NOT depend upon

(A) Temperature (B) Nature of solute

(C) Pressure (D) Nature of solvent

72. What is the osmotic pressure of 0.25 M urea solution at 27°C ($R = 0.0821$ L atm $mol^{-1}K^{-1}$)?

(A) 3.07 atm (B) 4.10 atm

(C) 6.15 atm (D) 2.46 atm

73. Which of the following statements is NOT true about the ideal solution?

(A) It obeys Raoult's law over the entire range of concentration.

(B) There is no heat evolved or absorbed when two components forming an ideal solution are mixed.

(C) There is no volume change when two components forming an ideal solution are mixed.

(D) The vapor pressure of the ideal solution can be higher or lower than those of pure components

74. 0.1 M solution of an electrolyte A^+B^- placed in a conductivity cell with electrodes 4 cm apart and each with cross-section area equal to 2 cm^2 was found to have a resistance of 200 Ω. What is molar conductivity of the solution?

(A) 100 $\Omega^{-1}cm^2\ mol^{-1}$

(B) 250 $\Omega^{-1}cm^2\ mol^{-1}$

(C) 0.250 $\Omega^{-1}cm^2\ mol^{-1}$

(D) 400 $\Omega^{-1}cm^2\ mol^{-1}$

75. What is the cell constant of a cell containing a solution of resistance 90 Ohm with conductivity 2×10^{-3} $Ohm^{-1}cm^{-1}$?

(A) 0.50 cm^{-1} (B) 0.18 cm^{-1}

(C) 0.029 cm^{-1} (D) 0.70 cm^{-1}

76. Dry cell is an example of

(A) Secondary voltaic cell (B) Primary voltaic cell

(C) Fuel cell (D) Photoelectric cell

77. For the reaction, $2N_2O_{5(g)} \rightarrow 4NO_{2(g)} + O_{2(g)}$ in liquid bromine, the rate of formation of NO_2 is 0.08 mol $dm^{-3}min^{-1}$. What is the rate of disappearance of N_2O_5?

(A) 0.01 M min^{-1}. (B) 0.02 M min^{-1}

(C) 0.03 M min^{-1}. (D) 0.04 M min^{-1}.

78. The rate law for the reaction, $A + B \rightarrow P$ is rate $= k[A][B]$. The rate constant of the reaction is 4.5 $M^{-1}s^{-1}$ at 25°C. Calculate the rate of the reaction when $[A] = 0.1$ M and $[B] = 0.2$ M.

(A) 9.25×10^{-2} M s^{-1} (B) 9.0×10^{-2} M s^{-1}

(C) 9.50×10^{-2} M s^{-1} (D) 9.75×10^{-2} M s^{-1}

79. Identify the order of reaction if rate of reaction is independent of the reactant concentration.

(A) zero order reaction (B) first order reaction

(C) second order reaction (D) third order reaction

80. Which of the following colloids contain dispersed phase and dispersion medium both in liquid state?

(A) Smoke (B) Butter

(C) Milk (D) Fog

81. Due to which property of helium, it has applicability in MRI machines

(A) Helium is an inert gas.
(B) Liquid helium absorbs oxygen
(C) Liquid Helium has the lowest boiling point of any element.
(D) Liquid Helium has the highest boiling point of any element.

82. Which of the following is NOT the electronic configuration of Lanthanoid?

(A) $[Xe]\ 4f^{10}\ 6s^2$
(B) $[Xe]\ 4f^1\ 5d^1\ 6s^2$
(C) $[Xe]\ 4f^{14}\ 5d^{10}\ 6s^1$
(D) $[Xe]\ 4f^7\ 5d^1\ 6s^2$

83. Which of the following elements belongs to rare earth elements, though found abundantly in earth crust?

(A) Thulium
(B) Nobelium
(C) Technetium
(D) Niobium

84. Which of the following coordination compounds is not likely to show optical isomerism?

(A) $[NiCl_2(en)_2]$
(B) $[Co(en)_3]^{3+}$
(C) $[Cu(NH_3)_4]^{2+}$
(D) $[PtCl_2(en)_2]^{2+}$

85. Which of the following is always a bidentate ligand?

(A) Ammonia
(B) Water
(C) Ethylenediamine
(D) Carbon monoxide

86. What is the main product obtained when sodium ethoxide reacts with isopropyl chloride?

(A) C_2H_5-O-CH-$(CH_3)_2$
(B) CH_3-CH=CH_2
(C) C_2H_5-O-C_2H_5
(D) $(CH_3)_2$-CH-O-CH-$(CH_3)_2$

87. What type of halide, the compound $C_6H_5CH_2Br$, is?

(A) allylic
(B) benzylic
(C) aryl
(D) vinylic

88. Identify the A and B in the following reactions in alcoholic medium.
$RX + AgCN \rightarrow A + AgX$
$RX + KCN \rightarrow B + KX$

(A) $A \rightarrow RNC; B \rightarrow RNC$
(B) $A \rightarrow RCN; B \rightarrow RNC$
(C) $A \rightarrow RNC; B \rightarrow RCN$
(D) $A \rightarrow RCN; B \rightarrow RCN$

89. Which of the following compounds, when treated with acetic anhydride, forms aspirin?

(A) Benzoic acid
(B) 2-Hydroxybenzoic acid
(C) 2-Methylbenzoic acid
(D) Benzene-1,2-dicarboxylic acid

90. Identify the organic compound having highest boiling point from following.

(A) n-$C_4H_9NH_2$
(B) $(C_2H_5)_2NH$
(C) C_4H_9OH
(D) C_2H_5-COOH

91. Which of the following acids has the highest acid strength?
(A) Acetic acid
(B) fluoroacetic acid
(C) 4-Nitrobenzoic acid
(D) 4-Methyl Benzoic acid

(A) (A)
(B) (B)
(C) (C)
(D) (D)

92. Identify the trend of solubility of carboxylic acid in water.

(A) Increases with increase in molecular mass.
(B) Decreases with increase in molecular mass
(C) Decreases with decreasing hydrophobic action
(D) Increases with increase in number of carbon atom

93. Which of the following acid does NOT contain -COOH group?

(A) Lactic acid
(B) Picric acid
(C) Benzoic acid
(D) Oxalic acid

94. What is the number of $-NH_2$ groups present in hexamethylenediamine?

(A) five
(B) two
(C) three
(D) six

95. Acetonitrile on reduction with sodium in ethanol gives A, which reacts with $NaNO_2$ and dil. HCl to form B. Identify product B.

(A) CH_3-CH_2-NH_2 (B) CH_3-CH_2-NO_2

(C) CH_3-CH_2-N_2Cl (D) CH_3-CH_2-OH

96. Formation of saccharic acid from glucose by oxidation with dilute HNO_3, confirms

(A) glucose contains five hydroxy groups.

(B) the presence of aldehyde group in glucose.

(C) glucose contains one primary alcoholic group.

(D) the six carbon atoms of glucose are in a straight chain.

97. What type of compound the Keratin is?

(A) globular protein (B) vitamins

(C) fibrous protein (D) polysaccharides

98. A sol gel process is based on

(A) synthetic polymerization process

(B) semi-synthetic polymerization process

(C) inorganic polymerization reactions

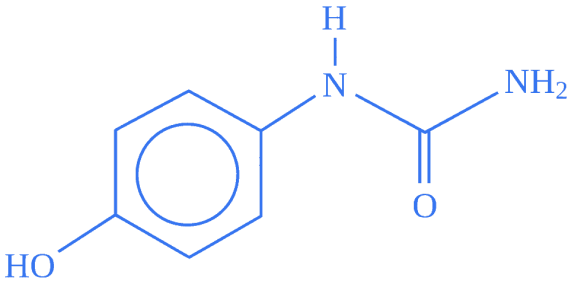
(D) natural polymerization process

99. Which of the following polymers is obtained from ε-Caprolactum?

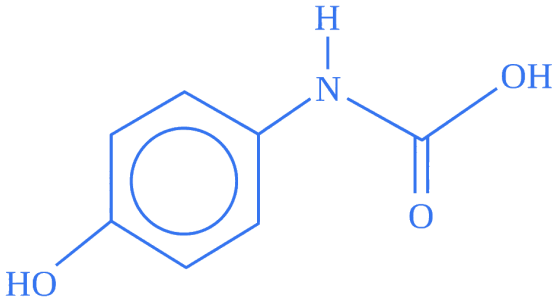
(A) Nylon 6,6 (B) Nylon 6

(C) Nylon 2,6 (D) Nylon 1,6

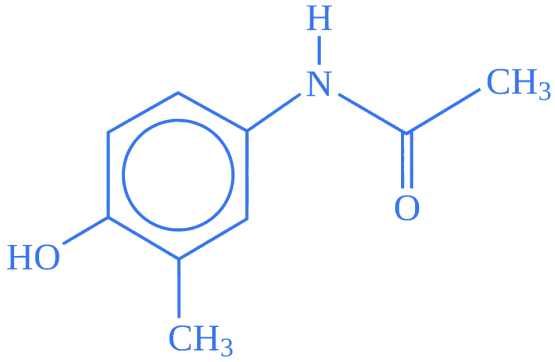
100. Identify the structure of paracetamol from the following.



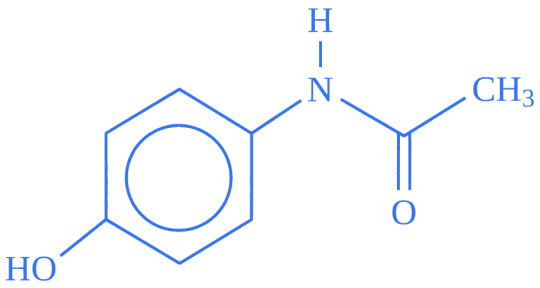
(A)



(B)

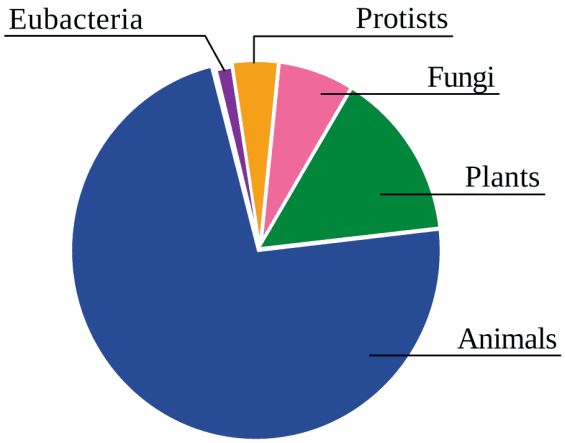


(C)



(D)

101. Based on the chart given below showing the number of species on earth, identify the INCORRECT statement.



(A) Animals are maximum in number.
(B) Plants are more than others except animals.
(C) Fungi are more than protists and eubacteria.
(D) Eubacteria are less than all others except protists.

102. The salt secreting glands are absent in ____.

(A) Albatross birds
(B) Sea turtles
(C) Sea clams
(D) Marine iguanas

103. Which one of the following is INCORRECT about endoparasites?

(A) Presence of suckers.
(B) Loss of digestive system
(C) Loss of unnecessary sense organs.
(D) Very low reproductive capacity.

104. Match List I with List II

List I (Types of stomata)	**List II (Group of plants where they occur)**
(A). Epistomatic	(I). Xerophytes
(B). Hypostomatic	(II). Mesophytes
(C). Amphistomatic	(III). Hydrophytes

Choose the **correct** answer from the options given below:

(A) (A) - (I), (B) - (II), (C) - (III)
(B) (A) - (II), (B) - (I), (C) - (III)
(C) (A) - (III), (B) - (I), (C) - (II)
(D) (A) - (III), (B) - (II), (C) - (I)

105. The basic shape of tooth is derived from dentin, which is a ____ tissue.

(A) dense connective
(B) calcified connective
(C) hyaline cartilage
(D) adipose

106. The pure form of water is NOT ____.

(A) inert
(B) neutral
(C) acidic
(D) inorganic

107. Lecithin is a phospholipid made up of the following ____.
(A). glycerol
(B). fatty acids
(C). phosphate group
(D). nitrogen compound
Choose the **correct** answer from the options given below:

(A) (A), (B) and (D) only.
(B) (A), (B) and (C) only.
(C) (A), (B), (C) and (D).
(D) (B), (C) and (D) only.

108. Which one of the following is a heteropolysaccharide?

(A) Starch
(B) Glycogen
(C) Heparin
(D) Cellulose

109. Match List I with List II

List I (Secondary metabolites)	**List II (Economic importance)**
(A). Terpene cannabinol	(I). protects cabbage from pests
(B). Glucosinolates	(II). pain reliever
(C). Tannin in chocolates	(III). recreation and stimulation
(D). Morphine	(IV). improves astringency

Choose the **correct** answer from the options given below:

(A) (A) - (I), (B) - (II), (C) - (III), (D) - (IV)

(B) (A) - (II), (B) - (IV), (C) - (I), (D) - (III)

(C) (A) - (I), (B) - (II), (C) - (IV), (D) - (III)

(D) (A) - (III), (B) - (I), (C) - (IV), (D) - (II)

110. The water in the xylem cells of plants shows capillarity due to properties like ____.

(A). surface tension

(B). adhesive forces

(C). cohesive forces

(D). neutral pH

Choose the **correct** answer from the options given below:

(A) (A), (B) and (D) only.

(B) (A), (B) and (C) only.

(C) (A), (B), (C) and (D).

(D) (B), (C) and (D) only.

111. Given below are two statements regarding the root pressure theory of translocation of water in plants.

Statement (I): Under normal conditions, the sap in the xylem cells shows negative hydrostatic pressure.

Statement (II): It also shows high osmotic pressure.

In light of the above statements, choose the *most appropriate* answer from the options given below.

(A) Both Statement (I) and Statement (II) are correct.

(B) Both Statement (I) and Statement (II) are incorrect.

(C) Statement (I) is correct but Statement (II) is incorrect.

(D) Statement (I) is incorrect but Statement (II) is correct.

112. Which one of the following does NOT favour absorption of water in plants?

(A) Low concentration of solutes in soil water.

(B) Increased transpiration rates.

(C) Presence of capillary water.

(D) Poorly aerated soil.

113. Which among the following represents the process of transamination?

(A) α-ketoglutaric acid + NH_4^+ + $NADPH_2$ $\rightarrow$ Glutamic acid + H_2O + NADP

(B) Glutamic acid + Oxaloacetic acid $\rightarrow$ α-ketoglutaric acid + Aspartic acid

(C) Glutamic acid + NH_4^+ + ATP $\rightarrow$ Glutamine + ADP

(D) Aspartic acid + NH_4^+ + ATP $\rightarrow$ Asparagine + ADP

114. Match List I with List II

List I (Deficiency Disorders)	**List II (Symptoms)**
(A). Chlorosis	(I). Localized death of tissues in leaves.
(B). Necrosis	(II). Premature fall of flowers, fruits and leaves.
(C). Mottling	(III). Yellowing of leaves due to the absence of chlorophyll.
(D). Abscission	(IV). Appearance of green and non-green patches on leaves.

Choose the **correct** answer from the options given below:

(A) (A) - (I), (B) - (II), (C) - (III), (D) - (IV)

(B) (A) - (II), (B) - (IV), (C) - (I), (D) - (III)

(C) (A) - (III), (B) - (I), (C) - (IV), (D) - (II)

(D) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

115. In which one of the following reactions is ADP/ATP not involved in phosphorylation?

(A) Glucose → Glucose 6 phosphate
(B) Fructose 6 phosphate → Fructose 1, 6 diphosphate
(C) Glyceraldehyde 3 phosphate → 1,3 biphosphoglycerate
(D) 1,3 bisphosphoglycerate → 3 phosphoglycerate

116. Which one of the following respiratory reactions does NOT yield CO_2?

(A) Pyruvic acid → Acetyl Co.A
(B) Pyruvic acid → Acetaldehyde
(C) Pyruvic acid → Lactic acid
(D) Pyruvic acid → Ethanol

117. The formation of ATP by oxidative phosphorylation takes place in ____.

(A) Glycolysis
(B) Krebs cycle
(C) ETS
(D) Fermentation

118. During ETS, when ubiquinol is oxidized by the cytochrome bc_1 complex, the electrons released are transferred to ____.

(A) Cytochrome a
(B) Cytochrome a_3
(C) Cytochrome C
(D) Molecular oxygen

119. If the volume of CO_2 evolved during respiration is less than the oxygen consumed, then the respiratory substrate would be ____.

(A) glucose
(B) fructose
(C) galactose
(D) fats

120. Tobacco plants produce flowers in the following conditions EXCEPT:

(A) Long uninterrupted dark period.
(B) Long uninterrupted light period.
(C) Short light period with uninterrupted long dark period.
(D) A long dark period is interrupted by a flash of red light and immediately followed by a far-red light.

121. Match List I with List II

List I (Phytohormones)	**List II (Applications causing)**
(A). Auxins	(I). Antitranspirant
(B). Gibberellins	(II). Epinasty
(C). Ethylene	(III). Apical dominance
(D). Abscisic acid	(IV). Bolting

Choose the **correct** answer from the options given below:

(A) (A) - (III), (B) - (IV), (C) - (II), (D) - (I)
(B) (A) - (II), (B) - (IV), (C) - (I), (D) - (III)
(C) (A) - (I), (B) - (II), (C) - (IV), (D) - (III)
(D) (A) - (III), (B) - (I), (C) - (IV), (D) - (II)

122. While describing the dynamics of cell growth, the ratio of change in number of cells over the time interval is called ____.

(A) Absolute Growth Rate
(B) Relative Growth Ratio
(C) Crude Birth Rate
(D) Specific Birth Rate

123. Which one of the following type of auxins produced in the placental tissue of the unfertilized ovary causes parthenocarpy in pineapple, and banana?

(A) IAA
(B) IBA
(C) NAA
(D) 2,4-D

124. The hormone secretin produced by the digestive system stimulates the secretion of the following EXCEPT:

(A) Gastric juice
(B) Bile juice
(C) Pancreatic juice
(D) Intestinal juice

125. During digestion and absorption in human, water-soluble vitamins are absorbed in ____.

(A) stomach
(B) lacteals in the villi
(C) blood capillaries in the villi.
(D) large intestine

126. The action of goblet cells present in the mucosa of the alimentary canal is helped by ____ glands.

(A) intestinal
(B) gastric glands
(C) Brunner's
(D) salivary

127. Mucosa forms cavities between the base of villi in the small intestine of human where intestinal glands are situated, which are called ____.

(A) sphincter of Oddi
(B) Sylvian sulcus
(C) crypts of Lieberkuhn
(D) pulp cavity

128. Pepsin and trypsin are both protein digesting enzymes, but mostly active in the stomach and duodenum respectively because ____.

(A) pepsin acts in acidic pH and trypsin in alkaline pH
(B) pepsin acts in alkaline pH and trypsin in acidic pH
(C) in the stomach, the temperature is above 40°C and in the duodenum it is less than 20°C
(D) in the stomach, the temperature is below 20°C and in the duodenum it is above 40°C

129. Which one of the following parts of the pharynx is the continuation of the internal nares?

(A) Laryngopharynx.
(B) Oropharynx.
(C) Nasopharynx.
(D) Epiglottis.

130. Given below are two statements about transport of O_2 and CO_2.
Statement (I): In the alveoli, where ppO_2 is high and $ppCO_2$ is low, the oxygen binds to haemoglobin.
Statement (II): In the alveoli under low $ppCO_2$, hydrogen ion and bicarbonate ions recombine under the influence of the enzyme carbonic anhydrase and release CO_2.
In light of the above statements, choose the *most appropriate* answer from the options given below.

(A) Both Statement (I) and Statement (II) are correct.
(B) Both Statement (I) and Statement (II) are incorrect.
(C) Statement (I) is correct but Statement (II) is incorrect.
(D) Statement (I) is incorrect but Statement (II) is correct.

131. Which one of the following respiratory disorders is NOT caused by bacteria or viruses?

(A) Chronic bronchitis
(B) Acute bronchitis
(C) Laryngitis
(D) Sinusitis

132. Identify the correct statements about human lungs.
(A). Each lung is enclosed in a double pleural membrane with a fluid filled cavity between them.
(B). The left lung is larger and divided into three lobes and the right lung is smaller and divided into two lobes.
(C). Each lung has a number of air sacs, each with 10-12 alveoli.
(D). There are about 700 million alveoli in the lungs.
Choose the **correct** answer from the options given below:

(A) (A), (B) and (D) only.
(B) (A), (B) and (C) only.
(C) (A), (B), (C) and (D).
(D) (A), (C) and (D) only.

133. The cerebrospinal fluid (CSF) is an alkaline fluid with a specific gravity of ____.

(A) 1.0
(B) 1.005
(C) 1.05
(D) 1.5

134. In human, blood pressure is directly proportional to the following factors EXCEPT:

(A) Length of blood vessel.
(B) Viscosity of blood.
(C) Partial Pressure of O_2 and CO_2.
(D) Venous return and cardiac output.

135. Complete the analogy.
Plasma : Blood without formed elements. :: Lymph : ____.
Choose from the options given below.

(A) Blood without WBC, platelets and some proteins.
(B) Blood without neutrophils and some proteins.
(C) Blood without RBC, platelets and some proteins.
(D) Blood without heparin and histamine proteins.

136. Given below are two statements about erythrocytes.
Statement (I): In the human foetus, the liver and spleen act as erythropoietic organs.
Statement (II): The old and worn out RBCs are destroyed in the liver and spleen and spleen is called the graveyard of RBC.
In light of the above statements, choose the *most appropriate* answer from the options given below.

(A) Both Statement (I) and Statement (II) are correct.
(B) Both Statement (I) and Statement (II) are incorrect.
(C) Statement (I) is correct but Statement (II) is incorrect.
(D) Statement (I) is incorrect but Statement (II) is correct.

137. In nephritis, the inflammation of the kidney is due to _____.

(A) severe bleeding
(B) cessation of glomerular filtrate
(C) obstruction in the ureters
(D) movement of fluid from blood into interstitial spaces.

138. Which one of the following is a genetic disorder of kidneys?

(A) Calcium stones.
(B) Cystine stones.
(C) Struvite stones.
(D) Uric acid stones.

139. The wastes like creatinine are actively absorbed from peritubular capillaries by ____ and ____.

(A) PCT and DCT
(B) PCT and descending limb of Henle's loop.
(C) Ascending limb of Henle's loop and DCT.
(D) DCT and collecting tubule.

140. The urea cannot pass out from the tubular fluid while flowing through the renal tubule in the following parts EXCEPT:

(A) Ascending limb
(B) DCT
(C) Deep medullary region of collecting duct.
(D) The cortical portion of the collecting duct.

141. In human kidney, a branch of efferent arteriole forms a loop-shaped vasa recta around ____.

(A) DCT
(B) PCT
(C) Henle's loop of nephrons
(D) Juxtaglomerular apparatus

142. Parkinson's disease is caused due to ____.

(A) loss of cholinergic neurons.
(B) accumulation of amyloid protein.
(C) the under activity of β-cells.
(D) degeneration of dopamine producing neurons.

143. The macula situated in the utricle and saccule consists of hair cells and supporting cells. The tips of hair and cilium project into a thick gelatinous sheath called _____ membrane.

(A) tectorial
(B) otolithic
(C) basilar
(D) Reissner's

144. Swimming is a ____ reflex.

(A) simple, monosynaptic, conditional
(B) simple, monosynaptic, unconditional
(C) complex, polysynaptic, conditional
(D) complex, polysynaptic, unconditional

145. In medullated nerves ____ prevents flow of Na^+ and K^+ ions between axoplasm and ECF.

(A) neuronal membrane
(B) neurilemma
(C) tonoplast
(D) myelin sheath

146. Once the impulse has been transferred across a synapse, the neurotransmitter is destroyed by _____.

(A) adenylate cyclase
(B) cholinesterase
(C) cholinergic fibres
(D) catecholamines

147. The interconnection between two neurons or neuron with a motor organ is called a synapse, and the synapse between only two neurons may be ____.
(A). axo-dendritic
(B). axo-axonic
(C). dendro-dendritic
(D). dendro-somatic
Choose the **correct** answer from the options given below:

(A) (A), (B) and (D) only.
(B) (A), (B) and (C) only.
(C) (A), (B), (C) and (D).
(D) (B), (C) and (D) only.

148. The autonomic nervous system controls cardiac activities in response to various inputs from the following EXCEPT:

(A) Photoreceptors.
(B) Proprio-receptors.
(C) Baroreceptors.
(D) Chemoreceptors.

149. Identify the characteristic features of Addison's disease caused due to hyposecretion of mineralocorticoids.
(A). Low blood sugar
(B). Low Na^+ and high K^+ concentration in plasma.
(C). Increased loss of Na^+ and water in urine.
(D). Obesity.
(E). Weight loss.
Choose the **correct** answer from the options given below:

(A) (A), (B) and (D) only.
(B) (A), (B) and (C) only.
(C) (A), (B), (C) and (E) only.
(D) (B), (C) and (E) only.

150. During the hormone action through membrane receptors, the peptide hormones bind to specific receptor molecules to form a complex and release an enzyme _____.

(A) adenylate cyclase
(B) carbonic anhydrase
(C) alkaline phosphatase
(D) cholinesterase

151. The stimulation for proliferation of new follicles in the ovary is influenced by the hormone _____.

(A) LH
(B) hCG
(C) GnRH
(D) ANH

152. Which one of the following is of great significance in horticulture?

(A) Cleavage polyembryony
(B) Recurrent apomixis.
(C) Non-recurrent apomixis.
(D) Nucellar adventive polyembryony.

153. During embryonal development in angiosperms, hypocotyl and a part of the radicle is formed by the lower tier of cells of the octant, whereas the other part of the radicle and root cap are formed by ____.

(A) upper tier of cells of octant
(B) hypocotyl
(C) hypophysis
(D) haustorium

154. Given below are two statements about endosperms in angiosperms.
Statement (I): Coconut has a nuclear type of endosperm with a multicellular outer part and a free nuclear vacuolated center.
Statement (II): In the helobial type of endosperm, the micropylar cell shows free nuclear division whereas the chalazal cell shows wall formation after free nuclear divisions.
In light of the above statements, choose the *most appropriate* answer from the options given below.

(A) Both Statement (I) and Statement (II) are correct.
(B) Both Statement (I) and Statement (II) are incorrect.
(C) Statement (I) is correct but Statement (II) is incorrect.
(D) Statement (I) is incorrect but Statement (II) is correct.

155. Which one of the following is INCORRECT about double fertilization in angiosperms?

(A) Syngamy is the fusion of haploid male and female gametes to form a diploid zygote.
(B) Triple fusion involves the fusion of a haploid male gamete with a diploid secondary nucleus.
(C) Both syngamy and triple fusion are generative fertilization.
(D) Both the male gametes participate in double fertilization.

156. Small, inconspicuous colorless flowers without nectar and fragrance are adaptations found in plants which are ____.

(A) anemophilous and hydrophilous.
(B) anemophilous and entomophilous.
(C) chiropterophilous and entomophilous.
(D) ornithophilous and chiropterophilous.

157. Which one of the following hormones is NOT involved in the process of parturition in human?

(A) ACTH
(B) hCG
(C) Corticosteroids
(D) Oxytocin

158. During embryonic development, mesoderm forms all types of muscles in human except ____.

(A) interstitial muscles
(B) ciliary muscles
(C) tongue muscles
(D) diaphragm

159. Given below are two statements about embryonic development in human.
Statement (I): There is no growth phase between cleavages and the size of blastomeres is reduced.
Statement (II): As the size is reduced, the subsequent cleavages are faster than earlier ones.
In light of the above statements, choose the *most appropriate* answer from the options given below.

(A) Both Statement (I) and Statement (II) are correct.
(B) Both Statement (I) and Statement (II) are incorrect.
(C) Statement (I) is correct but Statement (II) is incorrect.
(D) Statement (I) is incorrect but Statement (II) is correct.

160. Which one of the following is the primary female sex organ?

(A) Ovary
(B) Vagina
(C) Uterus
(D) Clitoris

161. Which one of the following could NOT be the genotypes of the parents of a child with the blood group "O" Rh^{+ve}?

(A) I^AI^0 Rh^{+ve} and I^AI^0 Rh^{+ve}
(B) I^BI^0 Rh^{+ve} and I^BI^0 Rh^{+ve}
(C) I^AI^B Rh^{+ve} and I^AI^B Rh^{+ve}
(D) I^AI^0 Rh^{+ve} and I^BI^0 Rh^{+ve}

162. Match List I with List II

List I (Organisms)	**List II (Chromosome number)**
(A). Roundworm	(I). 40
(B). Mouse	(II). 32
(C). Fruit fly	(III). 12
(D). Yeast	(IV). 8

Choose the **correct** answer from the options given below:

(A) (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
(B) (A) - (II), (B) - (IV), (C) - (I), (D) - (III)
(C) (A) - (I), (B) - (II), (C) - (IV), (D) - (III)
(D) (A) - (III), (B) - (I), (C) - (IV), (D) - (II)

163. Identify the INCORRECT statement about red-green color blindness in human.

(A) It is a disorder where a person fails to distinguish between red and green colours.
(B) It is due to the absence of cones in the retina of the eye.
(C) It is inherited from a colorblind father to his son.
(D) A dominant X linked gene is necessary for the formation of cones.

164. Which of the following statements are correct about Mendelian alleles?
(A). The dominant allele expresses itself in the presence of an alternative allele.
(B). The recessive allele does not express in the presence of the dominant allele.
(C). The F_1 hybrid produced in a cross between homozygous dominant and homozygous recessive is heterozygous.
(D). A homozygous individual for a trait breeds true and produces two different types of gametes.
Choose the **correct** answer from the options given below:

(A) (A), (B) and (D) only.
(B) (A), (B) and (C) only.
(C) (A), (B), (C) and (D).
(D) (B), (C) and (D) only.

165. In X and Y chromosomes, crossing over occurs only between ____.

(A) homologous regions of both X and Y
(B) non-homologous regions of both X and Y
(C) non-homologous region of X and homologous region of Y
(D) homologous region of X and non-homologous region of Y

166. In the F_2 generation, the genotypic and phenotypic ratios are identical in ____.

(A) Mendelian monohybrid cross
(B) Pleiotropy
(C) Co-dominance
(D) Multiple alleles

167. The DNA probe used in DNA fingerprinting consists of ____(A)____ and labeled with ____(B)____.
Choose the correct options for (A) and (B) respectively.

(A) (A) unknown sequence of double-stranded DNA (B) nitrocellulose filter paper
(B) (A) known sequence of double-stranded DNA (B) variable sequences of light and heavy chain
(C) (A) unknown sequence of single-stranded DNA (B) sticky and blunt ends
(D) (A) known sequence of single-stranded DNA (B) radioactive isotopes

168. Given below are two statements regarding Lac operon.
Statement (I): In Lac operon, in the absence of lactose, repressor protein binds to the operator gene and represses the process.
Statement (II): The lactose acts as an inducer of its own break down.
In light of the above statements, choose the *most appropriate* answer from the options given below.

(A) Both Statement (I) and Statement (II) are correct.
(B) Both Statement (I) and Statement (II) are incorrect.
(C) Statement (I) is correct but Statement (II) is incorrect.
(D) Statement (I) is incorrect but Statement (II) is correct.

169. Identify the correct order of the following enzymes used during the process of replication of eukaryotic DNA.
(A). DNA polymerase
(B). DNA ligase
(C). DNA helicase
(D). DNA gyrase
Choose the **correct** answer from the options given below:

(A) (A), (B), (C), (D).
(B) (D), (C), (A), (B).
(C) (D), (A), (B), (C).
(D) (C), (A), (B), (D).

170. Which one of the following experiments by Griffith with *Streptococcus pneumoniae*, resulted in the death of mice due to pneumonia?

(A) Mice injected only with heat killed S strain.
(B) Mice injected with live R strain and heat killed S strain.
(C) Mice injected with heat killed R as well as S strains.
(D) Mice injected only with heat killed R strain.

171. Which of the following is the correct order of human evolution?
(A). *Homo sapiens*
(B). *Homo habilis*
(C). *Homo erectus*
(D). Neanderthal man
Choose the **correct** answer from the options given below:

(A) (B), (C), (D), (A).
(B) (D), (C), (A), (B).
(C) (B), (A), (D), (C).
(D) (C), (B), (D), (A).

172. Which of the following epochs marks the major radiation of modern birds?

(A) Palaeocene
(B) Eocene
(C) Oligocene
(D) Miocene

173. Which one of the following explains Hardy-Weinberg's principle?

(A) In nature, a given habitat has enough resources to support a maximum possible number called carrying capacity.
(B) The allele frequency and genotypic frequency remain constant from generation to generation.
(C) The species richness increases with the increase in area but to a certain limit.
(D) Loss of key species will certainly cause a threat in a very short span of time.

174. Industrial melanism observed in different species of moths is an example of ____.

(A) stabilizing selection
(B) directional selection
(C) ecological isolation
(D) ethological isolation

175. During the chemical evolution of life, in the early atmosphere of earth, the most active light element was ____.

(A) carbon
(B) hydrogen
(C) oxygen
(D) nitrogen

176. Given below are two statements about Anabolic steroids.
Statement (I): In females, it causes acne, breast enlargement, kidney and liver dysfunctions.
Statement (II): In males, it causes masculinization, excessive hair growth on the body surface and deepening voice.
In light of the above statements, choose the *most appropriate* answer from the options given below.

(A) Both Statement (I) and Statement (II) are correct.
(B) Both Statement (I) and Statement (II) are incorrect.
(C) Statement (I) is correct but Statement (II) is incorrect.
(D) Statement (I) is incorrect but Statement (II) is correct.

177. Match List I with List II

List I (Types of sarcoma)	**List II (Organ/tissue affected)**
(A). Osteosarcoma	(I). Cartilage
(B). Myosarcoma	(II). Adipose tissue
(C). Chondrosarcoma	(III). Bone
(D). Liposarcoma	(IV). Muscles

Choose the **correct** answer from the options given below:

(A) (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
(B) (A) - (II), (B) - (IV), (C) - (I), (D) - (III)
(C) (A) - (I), (B) - (II), (C) - (IV), (D) - (III)
(D) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

178. Which one of the following diseases is NOT transmitted by mosquitoes?

(A) Malaria
(B) Typhoid
(C) Filariasis
(D) Dengue

179. In both syphilis and gonorrhoea, the infections are usually found in the following sites of human body except the ____ which is infected only in gonorrhoea.

(A) genital tract
(B) rectum
(C) oral region
(D) eye

180. Given below are two statements about vaccines.
Statement (I): Vaccines provide natural acquired active immunity.
Statement (II): The latest hot spot in the field of vaccine research is the development of oral vaccines.
In light of the above statements, choose the *most appropriate* answer from the options given below.

(A) Both Statement (I) and Statement (II) are correct.
(B) Both Statement (I) and Statement (II) are incorrect.
(C) Statement (I) is correct but Statement (II) is incorrect.
(D) Statement (I) is incorrect but Statement (II) is correct.

181. Isinglass is a byproduct of ____.

(A) sericulture
(B) apiculture
(C) poultry
(D) fisheries

182. Identify the INCORRECT definition regarding animal breeding.

(A) Inbreeding - Breeding of closely related individuals for 4 to 6 generations.
(B) Outbreeding - Breeding of unrelated individuals having no common ancestors for 4-6 generations.
(C) Outcrossing - crossing of superior male of one breed with superior female of another breed.
(D) Interspecific hybridization - breeding of two different but related species.

183. Match List I with List II

List I (Bio-fortified crops)	**List II (Enriched content)**
(A). Maize	(I). Vitamin-A.
(B). Wheat-Atlas 66	(II). Amino acids - lysine and tryptophan.
(C). Carrot	(III). Vitamin-C.
(D). Bitter gourd	(IV). High protein content.

Choose the **correct** answer from the options given below:

(A) (A) - (I), (B) - (II), (C) - (III), (D) - (IV)

(B) (A) - (II), (B) - (IV), (C) - (I), (D) - (III)

(C) (A) - (I), (B) - (II), (C) - (IV), (D) - (III)

(D) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

184. Identify the correct statements about plant breeding for developing resistance to insect pests.
(A). Hairy leaves in cotton - resistance to jassids.
(B). Hairy leaves in wheat - resistance to stem borers.
(C). Nectar-less cotton having smooth leaves - resistance against boll worms.
(D). High aspartic acid and low nitrogen and sugar content in maize - resistance to stem borers.
Choose the **correct** answer from the options given below:

(A) (A), (B) and (D) only.

(B) (A), (B) and (C) only.

(C) (A), (C) and (D) only.

(D) (B), (C) and (D) only.

185. In honey bees, the diploid zygote develops to form either fertile or sterile females, depending on ____.

(A) the sperm which fertilizes the egg.

(B) the food they consume during their development.

(C) the egg coming from the queen.

(D) the egg coming from the worker.

186. Match List I with List II

List I (Microbes)	**List II (Industrial products)**
(A). *Aspergillus niger*	(I). Enzyme-Invertase
(B). *Pseudomonas denitrificans*	(II). Citric acid
(C). *Saccharomyces cerevisiae*	(III). Chloromycetin
(D). *Streptomyces venezuelae*	(IV). Vitamin-B_{12}

Choose the **correct** answer from the options given below:

(A) (A) - (I), (B) - (II), (C) - (III), (D) - (IV)

(B) (A) - (II), (B) - (IV), (C) - (I), (D) - (III)

(C) (A) - (I), (B) - (II), (C) - (IV), (D) - (III)

(D) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

187. Which of the following techniques are used for the transfer of foreign DNA into the host cell?
(A). Microinjection
(B). Shot gun
(C). Ultrasonification
(D). Gel permeation
(E). Electroporation
Choose the **correct** answer from the options given below:

(A) (A), (B), (C) and (D) only.

(B) (A), (B), (C) and (E) only.

(C) (A), (B) and (D) only.

(D) (B), (C) and (D) only.

188. Identify the correct statements regarding biotechnology.
(A). Exonucleases cut the nucleotides at the ends of DNA strands.
(B). The sequences recognized by restriction enzymes are 4 to 8 nucleotides long.
(C). Baculoviruses are not vectors.
(D). *Agrobacterium tumefaciens* is a bacterium which can live only in plants.
(E). The bacteria protect their own DNA from nuclease attack by methylating the bases at susceptible sites.
Choose the **correct** answer from the options given below:

(A) (A), (B) and (D) only.
(B) (A), (B), (C) and (D) only.
(C) (A), (B), (C), (D) and (E).
(D) (A), (B) and (E) only.

189. Which one of the following is NOT an example of biopiracy?

(A) Neem.
(B) Basmati rice.
(C) Haldi (Turmeric).
(D) Mango.

190. Introduction of additional copies of bovine beta and kappa casein into dairy cattle resulted in ____(A)____ increase in beta casein and ____(B)____ increase in kappa casein.

(A) (A) 5 - 10 % (B) twofold
(B) (A) 8 - 20 % (B) twofold
(C) (A) twofold (B) 5 - 10%
(D) (A) twofold (B) 8 - 20%

191. Given below are two statements about desert plants.
Statement (I): Desert plants have thick cuticle on their leaf surfaces and sunken stomata.
Statement (II): Desert plants like *Opuntia* carry out photosynthesis with their leaves.
In light of the above statements, choose the *most appropriate* answer from the options given below.

(A) Both Statement (I) and Statement (II) are correct.
(B) Both Statement (I) and Statement (II) are incorrect.
(C) Statement (I) is correct but Statement (II) is incorrect.
(D) Statement (I) is incorrect but Statement (II) is correct.

192. Which of the following statements are correct about niche?
(A). It denotes the functional role played by an organism.
(B). The same niche is shared by two or more species.
(C). As soon as a niche is left vacant, other organisms fill that position.
(D). It includes the organism's role in the flow of energy from one organism to another.
(E). Organisms living in the same habitat differ in their niches.
Choose the correct answer from the options given below:

(A) (A), (B) and (D) only.
(B) (A), (B) and (C) only.
(C) (A), (B), (C) and (D) only.
(D) (A), (C), (D) and (E) only.

193. The tiger census in our national parks and tiger reserves is often based on ____.

(A) the number on the collar tied on their necks.
(B) the actual count of every individual.
(C) the pug marks and fecal pellets.
(D) the photograph of each individual.

194. Carbon present in fossil fuel is stored for the long-term in places called ____.

(A) source
(B) sinks
(C) sediments
(D) marsh-meadow

195. In secondary succession, the species that invades depends on the following EXCEPT:

(A) development of soil.
(B) availability of water.
(C) types of seeds present.
(D) other propagule present.

196. Every organism occupies a place in the ecological community according to the source of obtaining food. It is called ____ level.

(A) niche
(B) sere
(C) trophic
(D) rivet

197. The annual net primary productivity of the whole biosphere is approximately 170 billion tonnes. Of this, the productivity of all land-based ecosystems is about ____ billion tonnes.

(A) 115
(B) 85
(C) 65
(D) 55

198. In India we find about 1000 varieties of mangoes due to ____ diversity.

(A) interspecific (B) intraspecific

(C) ecological (D) intra-generic

199. The sound levels above ____ decibels may damage our ear drums.

(A) 20 (B) 80

(C) 100 (D) 150

200. Which among the following pairs of gases is the major cause of the 'green house effect'?

(A) O_2 and CO_2 (B) O_3 and CO_2

(C) CO_2 and CH_4 (D) O_2 and SO_2

- End of Question Paper -